



BOLDROCCHI

ESTABLISHED IN 1909

Boldrocchi Group

Corporate Overview

EXPECT QUALITY. EXPECT EXPERIENCE. EXPECT SOLUTIONS.



My grandfather started Boldrocchi in 1909 as a fan company. Over a hundred years later, Boldrocchi Group has become a world-renowned engineering, manufacturing and service firm with products in over 140 countries and offices in eight, including our headquarters near Milan, Italy. It is among the few companies in the world that offer a wide-ranging portfolio of solutions that include fans, blowers & compressors, air pollution control & environmental solutions, coolers & heat exchangers, gas turbine systems & noise protection and heavy-duty dampers & diverters, among other equipment.

At Boldrocchi, we pride ourselves on being forward-thinking experts and tailor-making each solution for every client. We put quality first. Quality when it comes to our technical advice, engineering solutions, manufacturing, testing, installation, commissioning and service. We want the Boldrocchi name to remain synonymous with the highest quality products, solutions and service.

Our goal: exceeding your expectations in quality, value, experience and trust. In other words complete customer satisfaction.

Massimo Boldrocchi



Over 100 Years of Experience & Expertise



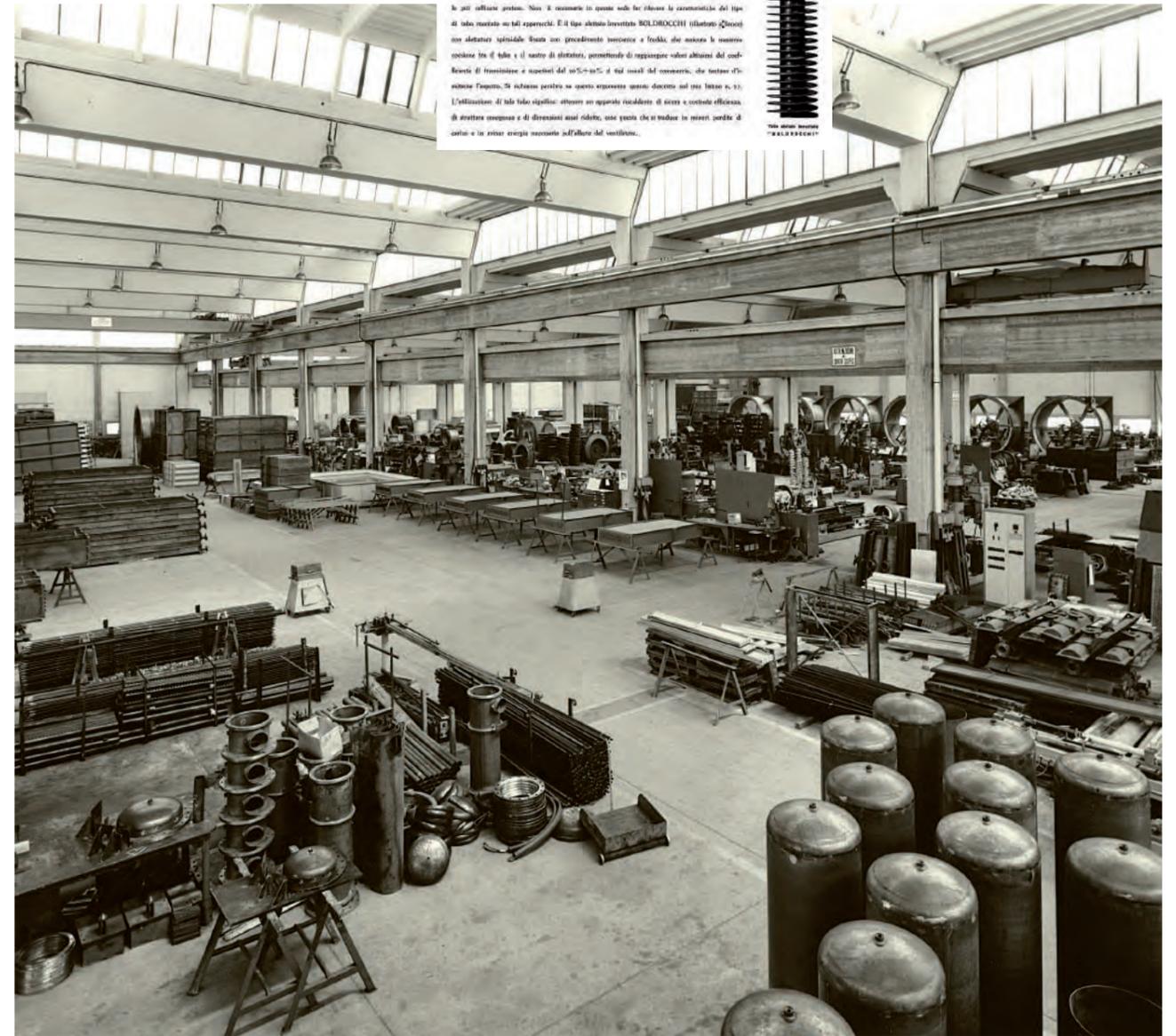
Engineer Luigi Boldrocchi (1880-1949)
Founder of Boldrocchi Company

Boldrocchi was founded in 1909 in Milan, by engineer Luigi Boldrocchi. Over a century later, the company has matured and expanded yet remains in the Boldrocchi family, who continue to put quality and customers first.

Boldrocchi began as a centrifugal fan company. Boldrocchi's influence was seen from the start: fans may have been born in the USA, but they were innovated in Europe, thanks in part to Boldrocchi's contribution. In 1911, Eng. Boldrocchi opened a 6,000 m² (65,000 ft²) manufacturing facility in Milan, which was later moved north to the company's current location in Biassono, Italy. In 1914, before most countries even had environmental emissions legislation, Boldrocchi again proved itself forward-thinking, starting to sell air filtration equipment to reduce fumes in and around plants. Boldrocchi has continued to grow in every sense since, expanding its expertise, product portfolio, manufacturing & testing facilities and global reach, as well as establishing international offices around the world.

AEROTERMI BOLDROCCHI

Alle serie di alette di tipo speciale, costruite, come sono, nel nostro stabilimento e specialmente adatte per l'impiego in locali industriali, risponde il tempo maggior sviluppo delle applicazioni dell'aeroterma e la particolare esigenza di dimensioni compatte, si affacciano questi tipi che riunisce alle ormai note qualità del prodotto BOLDROCCHI, una nuova serie estesa e caratterizzata di alette di tipo speciale, che permettono l'applicazione in qualsiasi condizione soddisfacendo le più difficili esigenze. Non è necessario in queste serie far ricorso la carenatura del tipo di tubo montato su tali apparecchi. E il tipo alette BOLDROCCHI (illettato) è fornito con ulteriore spigolo: forma un procedimento speciale a freddo, che assicura la massima resistenza tra il tubo e il nastro di alette, permettendo di raggiungere valori ottimali del coefficiente di trasmissione e superiori del 20% a 30% a tali usi del costruttore, che insieme all'attuale l'aspetto, si richiama per questo apparecchio questo concetto nel suo disegno n. 1). L'utilizzazione di tale tipo significa: ottenere un apparecchio riscaldato di serie e costruito efficientemente, di struttura semplice e di dimensioni assai ridotte, una qualità che si traduce in minori perdite di calore e in minor energia necessaria all'alimento del combustibile.



1909

Still family owned & operated

1,000 projects per year

500 employees



Started by Eng. Luigi Boldrocchi



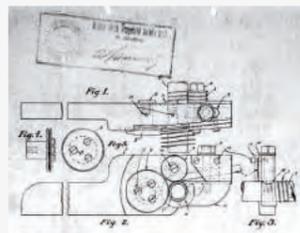
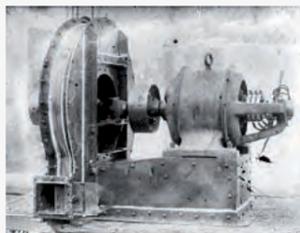
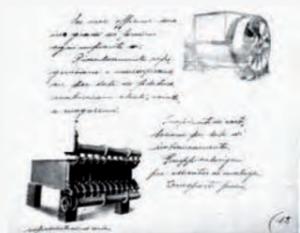
Over 88,000 orders



\$155 million USD (€145 million)



TODAY



Boldrocchi is worldwide



- USA
- ◆
- MEXICO
- ◆
- PORTUGAL
- ◆
- SPAIN
- ◆
- FRANCE
- ◆
- ITALY
- ◆
- EGYPT
- ◆
- INDIA

Boldrocchi's Complete Product Portfolio



Our Solutions

FANS, BLOWERS & COMPRESSORS

- Centrifugal fans
- Blowers
- Compressors
- Axial fans

HEAT EXCHANGERS & COOLERS

- Air cooled heat exchangers
- Electrical machine cooling
- Air recovery heaters
- Process condensers

AIR POLLUTION CONTROL & ENVIRONMENTAL SYSTEMS

- Dust removal
- Flue gas treatment
- Flue gas conditioning
- Handling, storage & structures

GAS TURBINE SYSTEMS & NOISE PROTECTION

- Silenced air inlet systems
- Silenced exhaust systems
- Heavy-duty silencers
- Enclosures

HEAVY-DUTY DAMPERS & DIVERTERS

- Heavy-duty dampers
- Guillotine dampers
- Multi-blade dampers
- By-pass diverters

SERVICE & RETROFITS

- On-site tests & analysis
- Maintenance & training
- Spare parts
- Retrofit/revamp solutions

Why Boldrocchi?

Expect Quality. Expect Experience. Expect Solutions.

Since its inception in 1909, Boldrocchi has continued to seek better solutions for its customers. Boldrocchi hires the brightest engineers, as well as technical and manufacturing teams, in order to offer a wide range of excellently crafted products and systems to industries and power generators around the world.

TRUSTWORTHY EXPERTISE

We have one of the most technically knowledgeable teams in the business, offering you expert advice and wise engineering solutions.

QUALITY PRODUCTS

We are among the few in the world to manufacture and test in-house in Europe with highly skilled tradespeople, ensuring top quality workmanship.

THE PERFECT FIT

We don't have catalogue products. Every solution is tailor-made to the exact parameters of your operation's needs, optimizing your production.

EXPERTS AT PROBLEM SOLVING

Our team excels at working with your process parameters & targets to find fitting solutions for complex issues.

FORWARD-THINKING

We invest heavily in R&D, always looking to improve our products, develop new ones and offer customers the best solutions on the market.

LONG-TERM COMMITMENT

We are committed to customer satisfaction, past commissioning and through to service. If something isn't 100%, we'll make it right.



360° Experience

Boldrocchi. Complete project management.

Boldrocchi prides itself on offering customers from a wide array of industries a truly turnkey experience. The company has invested in its manufacturing and testing facilities as well as its engineering, technical and service departments to ensure clients receive reliable, well-conceived and well-made systems.

QUALITY MANUFACTURING

We're one of a few to have our own in-house manufacturing facilities – 45,000 m² (500,000 ft²) of them. Our worldwide production base is in Italy where we have highly skilled workers and strict quality control.

RELIABLE SERVICE

Our service portfolio includes a knowledgeable worldwide problem assessment, maintenance and spare parts service.

IN-HOUSE TESTING

We have one of the biggest in-house testing facilities in the world open to clients. Testing in-house means the engineers who designed your products are closely overseeing their manufacturing and testing, ensuring optimal quality.

EXPERT ENGINEERING

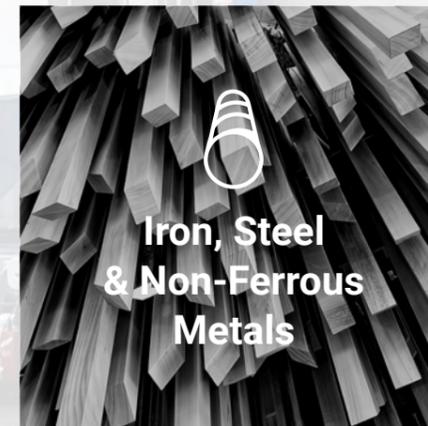
Boldrocchi is, at its core, an engineering company. Nearly half of our employees are engineers and finding you the right solution is one of our strong suits.

INSTALLATION & COMMISSIONING

We have extensive experience in installation and commissioning. As our teams understand our products best, they can guarantee the proper erection and functioning of your Boldrocchi products for years to come.

ECONOMICAL RETROFIT SOLUTIONS

When your CAPEX budget is limited, a refurbishment, retrofit (revamp) or conversion may be the answer. We can ensure that the performance of our retrofit solutions will exceed your targets.



Production Excellence

Expertise. References. Engineering. In-house facilities.

Boldrocchi is focused on delivering quality and has its own manufacturing and testing facilities to guarantee production excellence.

IN-HOUSE CFD MODELING

Boldrocchi engineers use computational fluid dynamics (CFD) modeling in nearly every project they design. To us, CFD modeling is pivotal to a well-engineered, quality and reliable result. The CFD we use:

- ◆ Analyzes the broad physical capabilities of the process
- ◆ Ensures optimal internal flow distribution & efficiency
- ◆ Minimizes vortex/vibration stress

IN-HOUSE MANUFACTURING

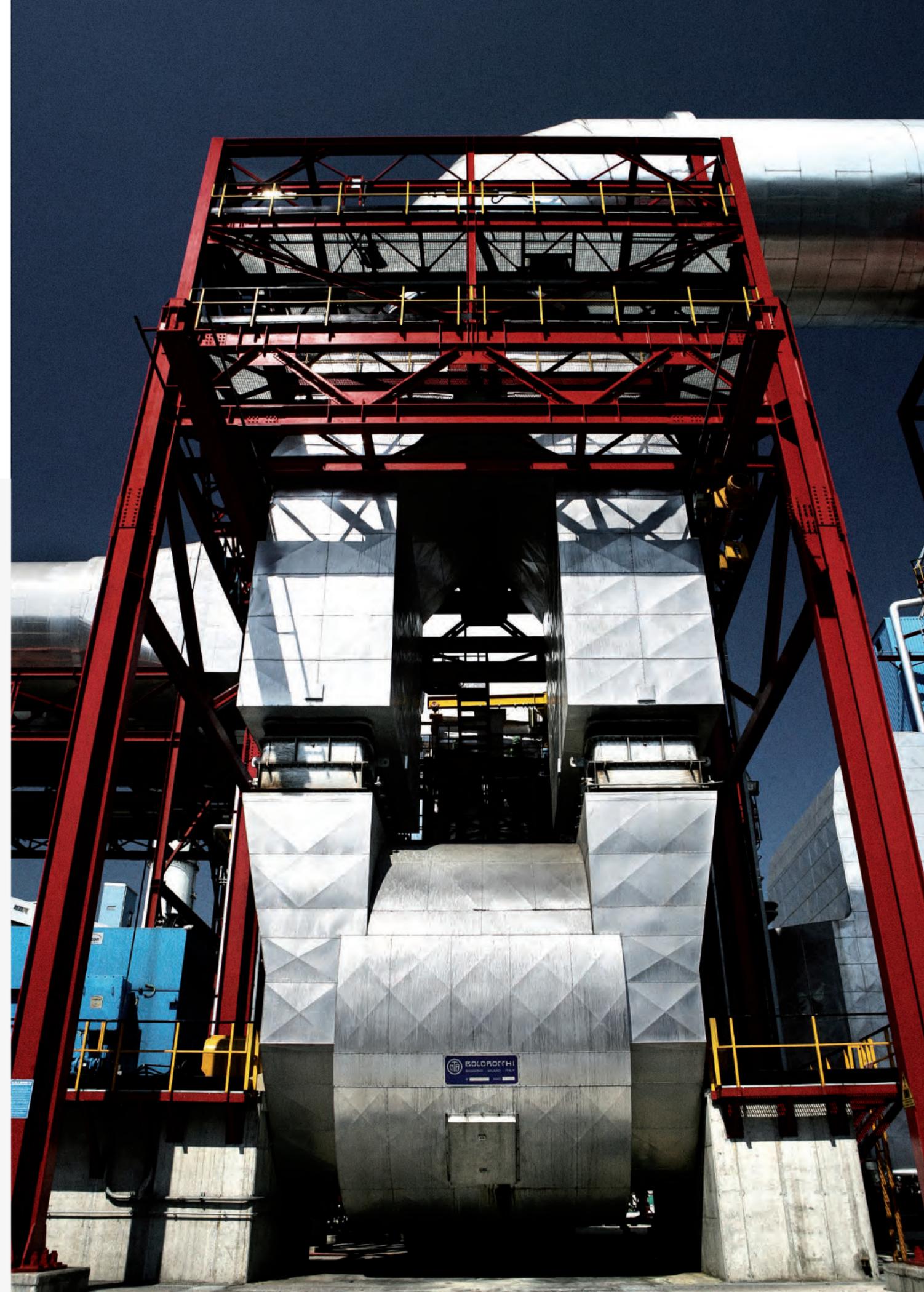
Boldrocchi has 45,000 m² (500,000 ft²) of manufacturing facilities. Our worldwide manufacturing is done near Milan, Italy. We have a highly skilled workforce – some of the best tradespeople in Europe – meaning products are sure to be well made, reliable and long lasting.

- ◆ 44 ton balancing machine
- ◆ ISO 9001:2008, OHSAS 18001:2007, UNI EN ISO 3834-2:2006, EN 1090-1:2009 + A1:2011
- ◆ Over 200 welding procedures qualified
 - ◇ ASME, AWS or EN norms

IN-HOUSE TESTING

Boldrocchi is one of the few manufacturing & engineering companies in the world to have their own testing facilities. We have three in-house testing centers offering:

- ◆ Nondestructive testing (NDT)
- ◆ Rotor balancing
- ◆ Hot gas testing
- ◆ Acoustic compliance
- ◆ Mechanical strength (up to 500 bar)
- ◆ Fan performance (up to 2000 KW)
- ◆ ASME & PED hydrostatic
- ◆ Running test for fans & heat exchangers
 - ◇ World's biggest fan test rig
- ◆ Complete pre-assembling



Fans, Blowers & Compressors



Fan innovators & experts.

Boldrocchi is the oldest and most experienced fan manufacturer in the world. The company is a worldwide leader in the production of tailor-made industrial heavy-duty fans with installed power of up to 10 MW (13,000 hp).

Advantages

UNIQUE DESIGN FEATURES

Our focus on R&D has led to unique features such as machine inlet cones and integral flanges that make our fans perform better and longer.

WORLDWIDE REFERENCES

We have tens of thousands of references in nearly every country.

PRECISE ENGINEERING

Our rotors are designed using finite element analysis (FEA) and are then manufactured & tested in our own workshop to ensure optimum performance.

VARIETY OF BLADE TYPES

We'll design your fan to attain peak efficiency under your particular process conditions considering the need for resistance to abrasion and build-up, among other factors.

WIDE RANGE OF MATERIALS

Including titanium, nickel/nickel alloys, chromium carbides, tungsten carbide and other special alloys.



Fans, Blowers & Compressors Product Portfolio



CENTRIFUGAL FANS

- ◆ Flow rate up to 2,500,000 m³/h (1,470,000 ft³/min)
- ◆ Up to 10 MW (13,000 hp) of installed power
- ◆ Tip speeds over 200 m/s (650 fps)
- ◆ Special blades design
- ◆ Corrosion & wear resistant materials
- ◆ High yield materials
- ◆ In-house manufacturing: API 560, API 673, ISO 9001
- ◆ Welding: ASME, AWS, EN norms
- ◆ In-house testing: AMCA 210/ other

COMPRESSORS

- ◆ Integrally geared solutions
- ◆ Flow rates: 1,500 to 300,000 m³/h (883 to 176,575 ft³/min)
- ◆ Pressure ratio: 1.5 to 14 bar (22 to 203 psi)
- ◆ Higher efficiency
- ◆ Oil-free application
- ◆ In-house manufacturing: API 672, API 617, ISO 9001

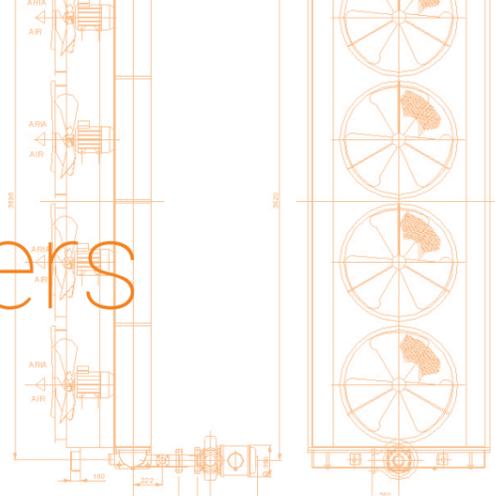
BLOWERS

- ◆ Flow rate up to 250,000 m³/h (147,145 ft³/min)
- ◆ Up to 5 MW (6,500 hp) of installed power
- ◆ Tip speeds over 280 m/s (920 fps)
- ◆ Hot-gas circulating fans up to 650°C / 1200°F (max. 850°C / 1560°F)
- ◆ Special blades design
- ◆ Double or multi-stage blowers: < 4 MW (5,360 hp) of installed power, pressure rise up to 900 mbar (13 psi)
- ◆ In-house manufacturing: API 672, API 617, API 673, ISO 9001
- ◆ Welding: ASME, AWS, EN norms
- ◆ In-house testing: ASME PTC 10
- ◆ System pressure: 0.2 to 15 bar.A (3 to 220 psi.A)

AXIAL FANS

- ◆ Flow rate up to 1,000,000 m³/h (588,578 ft³/min)
- ◆ High efficiency
- ◆ Fixed, adjustable & self variable pitch
- ◆ Single & multistage
- ◆ Special materials

Heat Exchangers & Coolers



Complex problems? We've got the solutions.

Boldrocchi has been manufacturing coolers since 1931. We tailor-make each of our heat exchangers and coolers to our customers' specifications. We are also specialists at analyzing your process parameters to find you the optimal process or machine cooling solution.

Advantages

ENGINEERING & MANUFACTURING

We design & manufacture all parts of a cooling system: heat exchanger, tubes (finned and regular), fans, circulating pump & electrical devices.

CUSTOMIZED TO ANY SIZE

We can design and produce any size of cooling system, from small to immense.

CAREFULLY CHOSEN MATERIALS

We accurately calculate which material should be chosen from a variety of options including alloy copper-nickel 90/10, titanium, and other special materials.

SPECIALIZED WELDERS

The tradespeople at our Italian manufacturing facility are among the best, ensuring you top quality products.

REINFORCED CASING AVAILABLE

We have numerous references in this specialty, required to resist shock in certain applications.

DETAILED ANALYSIS & TESTING

Our in-house facilities allow us to undertake thermal, mechanical, structural, stress and noise tests, guaranteeing peak performance and reliability.



Air Cooled Heat Exchangers

In industrial and power generation process applications, our process flow heat exchangers cool gas, oil, hydrocarbons, steam and vapors with air or gas. We can design and manufacture them for any pressure and temperature parameters to meet the most demanding conditions.



- ◆ Limitless pressure and temperature capabilities
- ◆ Customization to withstand extreme temperatures, corrosive environments, seismic areas and other demanding conditions
- ◆ Expert problem-solvers for complex installations
- ◆ In-house produced finned tubes with 11 finning machines producing:
 - ◇ Footed fins
 - ◇ Embedded fins
 - ◇ Extruded fins
 - ◇ ½" to 2" diameter
 - ◇ Variety of metals
- ◆ Mechanical design in accordance with standard codes (TEMA, ASME, API) and "U", "CE" and "PED" stamps available



Electrical Machine Cooling

We design and manufacture coolers for both power generators and heavy industry. What sets us apart is not only our 80 years of experience, but our ability to provide custom-made high quality solutions for entire systems around coolers including the air intake, cooler, exhaust, fan, oil pump and noise control systems.



- ◆ We cool:
 - ◇ Motors
 - ◇ Generators
 - ◇ Transformers
- ◆ Custom-made high quality solutions for your entire cooling system:
 - ◇ Air intake
 - ◇ Cooler
 - ◇ Exhaust
 - ◇ Fans
 - ◇ Oil Pump
 - ◇ Noise
- ◆ Air-to-air, air-to-water, water-to-hydrogen, air-to-oil, water-to-oil
- ◆ Single & double tube cooler elements
- ◆ With/out forced ventilation
- ◆ ASME VIII / U STAMP





Air Pollution Control & Environmental Solutions

Boldrocchi began engineering air pollution control in 1914. We've continued to lead ever since.

Our dust removal solutions can achieve zero emissions: 0.1 mg/Nm^3 (0.06 gr/ft^3). Our flue gas treatment solutions remove: dust, acid gases, nitrogen oxides, sulfur oxides, mercury, furans, hydrochloric acid, dioxins and other heavy metals. We offer everything needed to meet or surpass all air emission regulations worldwide.

Advantages

CERAMIC ELEMENTS INFILTRATION

Boldrocchi is among few companies having references in ceramic candle filters able to withstand temperatures of 800°C (1472°F) and peak temperatures of 1000°C (1832°F).

UNBEATABLE PERFORMANCE

Our solutions can far exceed all worldwide air emissions regulations, in terms of number of dust particles, particle size (or PM) & pollutant emissions.

A CENTURY OF REFERENCES

We've successfully supplied hundreds of plants with environmental solutions around the globe.

EXHAUSTIVE ENVIRONMENTAL PRODUCT PORTFOLIO

We not only offer all dust removal and flue gas treatment (FGT) solutions, but a wide range of conditioning, handling & storage equipment as well as structures.

NEW & REFURBISHED SOLUTIONS

Our unmatched technical team can design exceptional systems, whether new or a retrofit, refurbishment or conversion solution.

RESPECT FOR YOUR PRODUCTION GOALS

We'll advise you on your APC needs based your process parameters legislation.



A Complete Air Pollution Control Product Portfolio



DUST REMOVAL

Fabric filters

- ◆ Pulse-jet ◆ High dust
- ◆ Explosion-proof filters
- ◆ Integrated filters

Dry Electrostatic Precipitators (ESP)

Hybrid filters

Ceramic candle filters

(high temperature filtration)

Dust removal scrubbers

Cyclones

- ◆ High-efficiency ◆ Multi-cyclones

Nuisance filters

- ◆ All types

FLUE GAS TREATMENT

DeNO_x

- ◆ Selective Catalytic Reduction (SCR)
- ◆ Selective Non-Catalytic Reduction (SNCR)

DeSO_x & Acid control

- ◆ Dry sorbent injection (DSI) systems
- ◆ Dry sorbent reactors
- ◆ Circulating dry scrubbers
- ◆ Recirculation systems
- ◆ Semi-dry scrubbers

Mercury, heavy metals & dioxins

- ◆ Activated carbon injection (ACI) systems

FLUE GAS CONDITIONING

Air-to-gas heat exchangers

Gas conditioning

- ◆ Natural & forced air draft
- ◆ Evaporative spraying towers

Hot gas ducts

- ◆ Water-cooled pipe to pipe walls
- ◆ Combustion chambers

HANDLING, STORAGE, STRUCTURES

Dust handling

- ◆ Mechanical conveyors
- ◆ Extraction valves
- ◆ Ash and dust pneumatic conveying

Other equipment

- ◆ Silos
- ◆ Multi-level structures
- ◆ Stacks
- ◆ Motors
- ◆ Fans
- ◆ Dampers

Gas Turbine Systems & Noise Protection

Optimizing your power generation's performance.

Boldrocchi has been engineering and manufacturing power generation ancillaries and noise protection for over 65 years. Our equipment and expertise can be found in all types of plants around the world.

Advantages

RESULTS IN ANY ENVIRONMENT

We can design your equipment solutions to withstand any harsh environment, whether it be heat, wind, cold, humidity and/or salty air.

SINGLE POINT OF COMPETENCY

We are one of a handful of companies in the world with the expertise to engineer and manufacture solutions treating all complex parameters of a gas turbine.

TRUSTWORTHY EXPERIENCE

Boldrocchi has over 400 inlet & silencing systems installed in gas turbine power plants around the world.

NOISE CENTRE OF EXCELLENCE

We have the technical proficiency to meet all noise abatement regulations whether for gas turbines, fans, coolers or other machinery.

100% OWNERSHIP OF TECHNOLOGY

We design & make it all. Our solutions overlap specialties & involve numerous products. A single source for questions, maintenance needs & warranties is priceless.

IN-HOUSE TESTING OPEN TO CLIENTS

Our full-scale facility is in accordance with international standards and can test full air intake systems as well as other equipment.



Our Solution



FOR GAS TURBINES

- ◆ Complete air intake systems
- ◆ All cooling systems
- ◆ Noise/safety enclosures for gas turbines
- ◆ Complete exhaust systems
- ◆ By-pass stacks
- ◆ Dampers on boiler stack
- ◆ Fresh air dampers on boiler

FOR ANY APPLICATION

- ◆ Noise protection/silencers

FOR HEAT RECOVERY STEAM GENERATORS (HRSG)

- ◆ Dampers
- ◆ Noise protection
- ◆ Exhaust systems

FIRE BOILER AND INDUSTRIAL

- ◆ Air intake systems
- ◆ All cooling systems
- ◆ Dampers
- ◆ Noise protection

Heavy-Duty Dampers & Diverters

Poor dampers = major problems.
Our highly engineered dampers = problem solved.

Dampers may seem like simple pieces of equipment, but when they won't open or close one realizes how important they are. Many take dampers for granted, which has led some to make major mistakes in contracting inexpensive and inexperienced companies to produce their dampers, often resulting in costly production stoppages.

Advantages

FLEXIBLE DESIGN

We tailor-make dampers of any size up to 7m x 7m (23' x 23'), shape (square, rectangular, round, etc.), with any activation system (manual, electric or pneumatic).

100% GAS TIGHTNESS

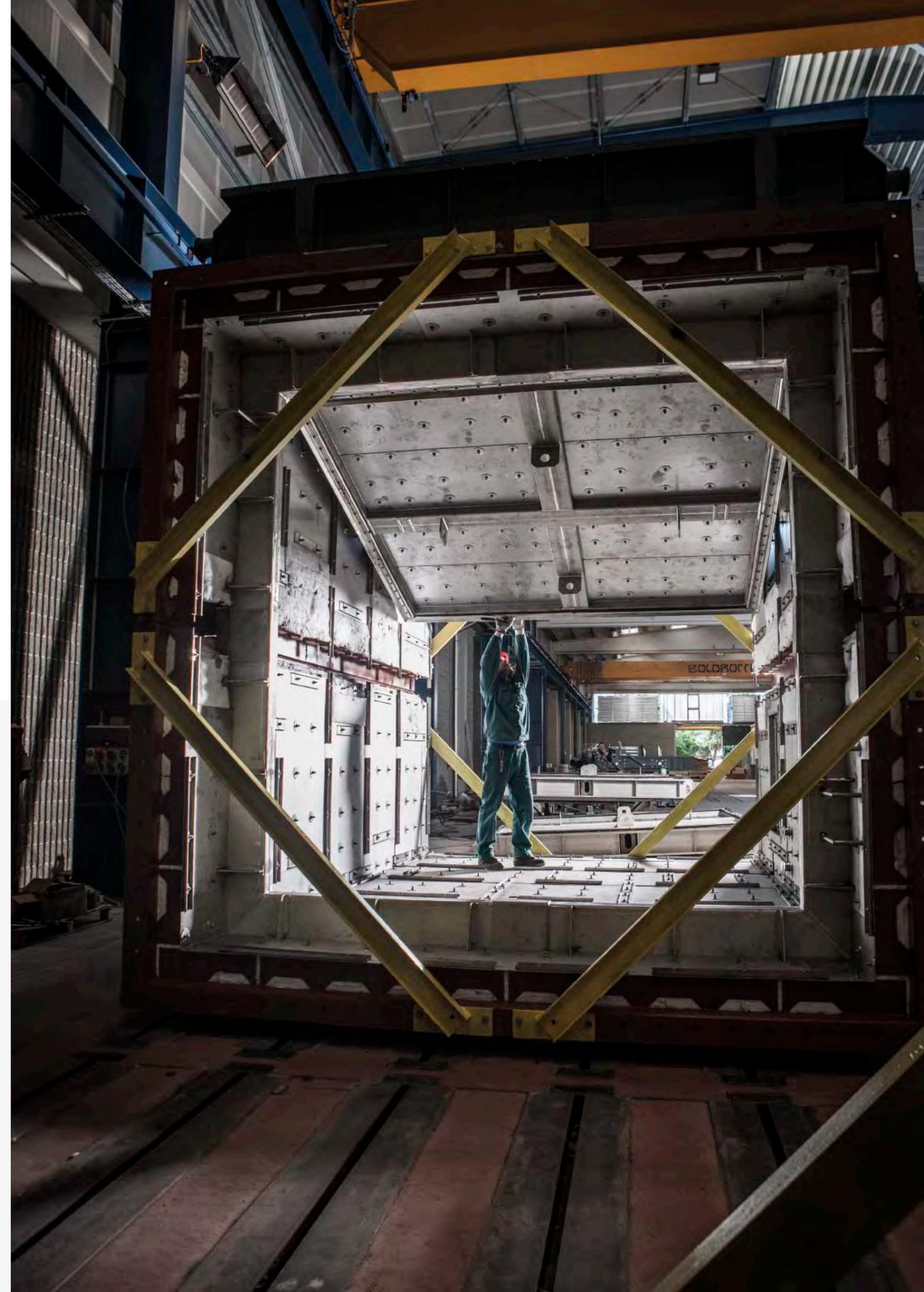
Our specially engineered single blade diverters & tandem dampers ensure 100% gas tightness, even in high temperature, high velocity environments.

HEAVY-DUTY CAPABILITIES

We are experts at engineering dampers for highly corrosive, abrasive & high temperature environments.

We offer all types of dampers, including on/off, modulating and zero leakage dampers:

- ◆ Heavy duty dampers
- ◆ Guillotine dampers
- ◆ Butterfly dampers
- ◆ Diverters
- ◆ By-pass dampers
- ◆ Stack dampers
- ◆ Gas distributors
- ◆ Multi-louvres



Turnkey Project Capabilities

Technical know-how to offer you the complete solution.

We have extensive experience in installation and commissioning. As our teams understand our products best, they can guarantee the proper erection and functioning of your Boldrocchi products for years to come.



- ◆ Complete on-site & data-based needs analysis
- ◆ Recommendations to meet current & future legislation
- ◆ Installation
- ◆ Installation supervision
- ◆ Commissioning
- ◆ On-site training
- ◆ Maintenance services
- ◆ Spare parts



Service & Retrofits

Need better performance from your systems or on-site expertise?

Our technical strength and problem-solving capabilities extend to Boldrocchi's Service & Retrofits team. Complementing Boldrocchi's engineering, manufacturing and testing core, this team offers you on-site support and advice, rounding-out Boldrocchi's truly turnkey capabilities.

Services

- ◆ Initial performance tests
- ◆ Situation analysis and reports
- ◆ Plan elaboration
- ◆ Maintenance
- ◆ Inspections
- ◆ Training
- ◆ Spare parts

Retrofit/Revamp

When your CAPEX budget is limited, a refurbishment, retrofit (revamp) or conversion may be the answer. Boldrocchi will enhance the capabilities of your existing equipment, whether original Boldrocchi equipment or that of another OEM.

- ◆ Elaboration of a retrofit, refurbishment or conversion plan
- ◆ Engineering of tailor-made solution
- ◆ In-house manufacturing
- ◆ In-house testing
- ◆ On-site installation & testing
- ◆ Commissioning



Research & Development

Looking for a forward thinking partner?

We aim to further improve the designs of existing products & systems to increase performance and decrease energy consumption as well as innovate state-of-the-art technology.

◆ NANOMETRIC PARTICLE EMISSIONS

Our air pollution control R&D team has worked with the University of Naples to develop a new wet electrostatic precipitator (ESP) that captures not only PM 10 and PM 2.5, but nanometric dust particles (1000 times smaller than PM 2.5). This puts Boldrocchi ahead of legislation, which is sure to regulate nanometric dust for industry in the coming years.

◆ INTEGRATED SOLUTIONS FOR SULFUR RECOVERY UNITS

Experts in API 673 blowers for sulfur recovery, Boldrocchi wanted to extend its offering to include centrifugal compressors meeting API 617 & API 672 for higher pressure applications.

◆ 12-METER/40-FOOT FILTER BAGS

After significant theoretical calculations and CFD modeling, we were able to set-up a 1:1 scale model to test the performance – according to international standards – of 12 m (40 ft) filter bags with both conical and cylindrical shapes.



USA

MEXICO

PORTUGAL

SPAIN

FRANCE

ITALY

EGYPT

INDIA

GROUP HEADQUARTERS

Viale Trento e Trieste 93 • 20853 Biassono (MB) • Italy

T. +39 039 2202.1 • F. +39 039 2754200

E-mail: info@boldrocchigroup.com

www.boldrocchigroup.com



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- ◆ Heat Exchangers & Coolers
- ◆ Air Pollution Control & Environmental Solutions
- ◆ Gas Turbine Systems & Noise Protection
- ◆ Heavy-Duty Dampers & Diverters